What is claimed is:

1. In a microlithography apparatus for transferring a pattern onto a sensitive substrate using a charged particle beam, the apparatus including components of a charged-particle-beam (CPB) optical system as used for imaging the pattern at specified locations on the substrate, a temperature-control device, comprising:

a respective temperature sensor associated with at least one component of the CPB optical system;

a temperature-monitoring device to which the at least one temperature sensor is connected, the temperature-monitoring device being configured to receive the respective temperature-detection signals from the at least one temperature sensor, to ascertain whether the temperature-detection signals indicate existence of a temperature anomaly, and to produce respective temperature-control commands; and

a controller to which the temperature-monitoring device is connected, the controller being configured to receive the temperature-control commands from the temperature-monitoring device and, if the temperature-control commands indicate existence of the temperature anomaly, to initiate at least one action selected from triggering an alarm, stopping exposure, and calibration of the microlithography system.

2. The temperature-control device of claim 1, wherein:

the CPB optical system comprises a CPB source, at least one condenser lens, at least one projection lens, at least one deflector, and at least one stage; and

a respective temperature sensor is associated with each of the CPB source, the at least one condenser lens, the at least one projection lens, the at least one deflector, and the at least one stage.

3. The temperature-control device of claim 1, further comprising a display connected to the temperature-monitoring device and configured to display

temperature data as obtained by the at least one temperature sensor and interpreted by the temperature-monitoring device.

4. The temperature-control device of claim 1, further comprising a warning device connected to the temperature-monitoring device and configured to activate an alarm if a temperature detected by a temperature sensor exceeds a respective specification, thereby indicating existence of the temperature anomaly.

5. The temperature-control device of claim 1, wherein the temperature-monitoring device is configured to ascertain whether the temperature-detection signals indicate a temperature anomaly in which a temperature as sensed by a temperature sensor has exceeded a specified value.

6. The temperature-control device of claim 1, wherein the temperature-monitoring device is configured to ascertain whether the temperature-detection signals indicate a temperature anomaly in which a temperature as sensed by a temperature sensor has exceeded a specified gradient.

7. The temperature-control device of claim 6, wherein the temperature-monitoring device is configured to trigger the alarm whenever a detected temperature gradient is at least 0.04 °C/s, to trigger a calibration of the CPB microlithography apparatus whenever a detected temperature gradient is at least 0.08 °C/s, and to trigger a halt of exposure whenever a detected temperature gradient is at least 0.1 °C/s.

8. A microlithography method for transferring a pattern onto a sensitive substrate using a charged particle beam passing through a charged-particle-beam (CPB) optical system, the method comprising:

detecting respective temperatures of components of the CPB optical system;

continuously monitoring the respective detected temperatures of the components so as to produce temperature-monitoring data;

processing the temperature-monitoring data, including comparing the data to respective specified temperature data for the respective components to determine whether the temperature-monitoring data indicate existence of a respective temperature anomaly; and

if a temperature anomaly is indicated, then initiating at least one action selected from triggering an alarm, stopping exposure, and calibration of the microlithography system.

9. The method of claim 8, further comprising the step of displaying the temperature-monitoring data.

10. The method of claim 9, wherein the temperature-monitoring data are displayed in real time.

11. The method of claim 8, wherein:

the CPB optical system comprises a CPB source, at least one condenser lens, at least one projection lens, at least one deflector, and at least one stage; and

the detecting step comprises detecting a respective temperature of each of the CPB source, the at least one condenser lens, the at least one projection lens, the at least one deflector, and the at least one stage.

12. The method of claim 8, wherein the monitoring step comprises ascertaining whether a detected temperature has exceeded a specified value indicative of the temperature anomaly.

13. The method of claim 8, wherein the monitoring step comprises ascertaining whether a detected temperature has exceeded a specified gradient indicative of the temperature anomaly.

14. The method of claim 13, wherein the action-initiating step comprises:

triggering an alarm whenever a detected temperature gradient is at least 0.04 °C/s;

triggering a system calibration whenever a detected temperature gradient is at least 0.08 °C/s; and

triggering a halt of exposure whenever a detected temperature gradient is at least 0.1 °C/s.

15. A microlithography apparatus, comprising a temperature-control device as recited in claim 1.

16. A charged-particle-beam microlithography apparatus, comprising:

an illumination-optical system comprising multiple components subject to performance change upon experiencing respective changes in operating temperature;

a projection-optical system situated downstream of the illumination-optical system and comprising multiple components subject to performance change upon experiencing respective changes in operating temperature; and

a temperature-control device, including a respective temperature sensor associated with each of said components of the illumination-optical system and projection-optical system, a temperature-monitoring device, and a controller, wherein the temperature-monitoring device is connected to the temperature sensors and is configured to receive the respective temperature-detection signals from the temperature sensor, to ascertain whether the temperature-detection signals indicate existence of a temperature anomaly, and to produce respective temperature-control commands, and wherein the controller is connected to the temperature-monitoring device and is configured to receive the temperature-control commands from the temperature-monitoring device and, if the temperature-control commands indicate existence of the temperature anomaly, to initiate at least one action selected from triggering an alarm, stopping exposure, and calibration of the microlithography system.

17. The charged-particle-beam microlithography apparatus of claim 16, wherein the temperature-monitoring device is configured to ascertain whether the temperature-detection signals indicate a temperature anomaly in which a temperature as sensed by a temperature sensor has exceeded a specified value.

18. The charged-particle-beam microlithography apparatus of claim 16, wherein the temperature-monitoring device is configured to ascertain whether the temperature-detection signals indicate a temperature anomaly in which a temperature as sensed by a temperature sensor has exceeded a specified gradient.

19. A method for fabricating a microelectronic device, comprising performing a microlithography method as recited in claim 8.

20. A method for fabricating a microelectronic device, comprising performing a microlithography method using a CPB microlithography apparatus as recited in claim 8.